The Gap In Water and Wastewater Infrastructure and the Changing Face of Utility Management

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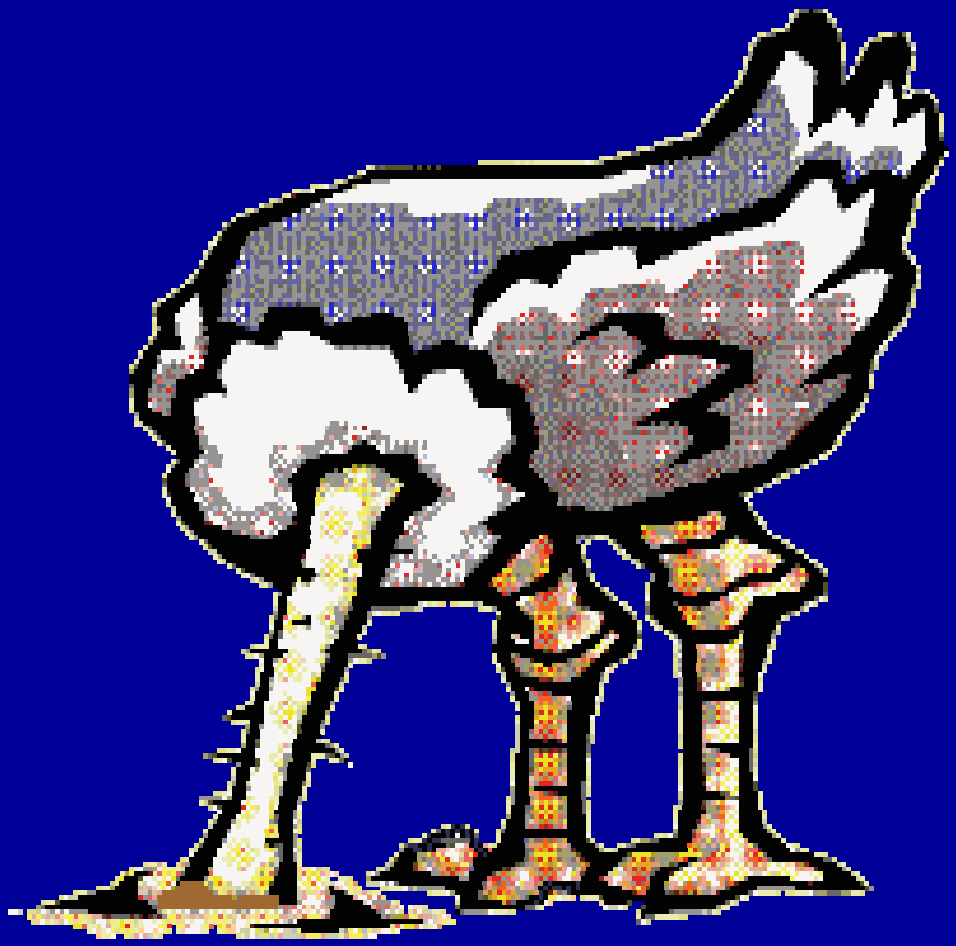
Advancing Asset Management In Your Utility
St Louis, Missouri – September 9, 2003

The Organization of This Presentation

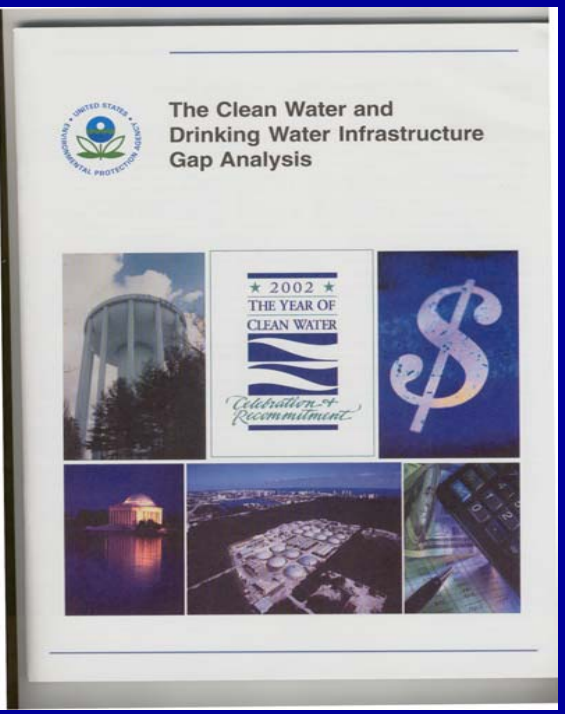
- **The Gap Analysis and situation assessment of water and wastewater Infrastructure issues.**
- **The emergence of a comprehensive management system paradigm.**

The First Stage in Confronting a Problem Is Recognizing the Problem Exist



A "Gap Analysis" is used to establish a common quantification of the challenge

The Gap Report Released At WEFTEC



www.epa.gov/ow

- **Purpose -- To reach a common quantitative understanding of the potential magnitude of investment needed to:**
  - **Address growing population and economic needs, and**
  - **Renew our existing aging infrastructure.**
- **The data is comparable, at order of magnitude level, with WIN & CBO reports.**

The Report Is Intended to Provide a Transparent Presentation of the Numbers

- **Estimates are made for water and wastewater, investment, cost and payments (2000-2019).**
- **Gap = Needs (-) Spending.**
- **The key forecast in the EPA "gap analysis" is payments which best equates to a cash flow analysis.**
- **The "gap" is not inevitable. It can be, at least mitigated, with significant changes.**

The Findings For The 20 Years (2000-2019)

No Revenue Growth Scenario

Total Payment Gap (20 Years) (Average in Billions of Dollars)		
	Clean Water	Drinking Water
Capital	$122	$102
O&M	$148	$161
Total	$271	$263

Revenue Growth Scenario

Total Payment Gap (20 Years) (Average in Billions of Dollars)		
	Clean Water	Drinking Water
Capital	$21	$45
O&M	$10	$0
Total	$31	$45

(Annual Rate of Increase - 3% Real)

The EPA "Gap Analysis" Conclusions {First Tier}

- **We Are Not on a Sustainable Course.**
- **The "Gap" is large and growing.**
- **The current trends in capital spending are not adequate to replace the aging systems and make new high priority investments.**

The EPA "Gap Analysis" Conclusions: {Second Tier}

- **Communities report that fees have grown.**
- **In Ohio, average sewer and water fees doubled 1983-1999.**
- **To meet future revenue requirements the average fees will, almost double, again.**
- **For many households, these fees are a small part of the budget, but lower income households will be stretched.**
- **To further complicate the challenge, the investment associated with achieving efficiency and productivity gains – appears to have declined.**

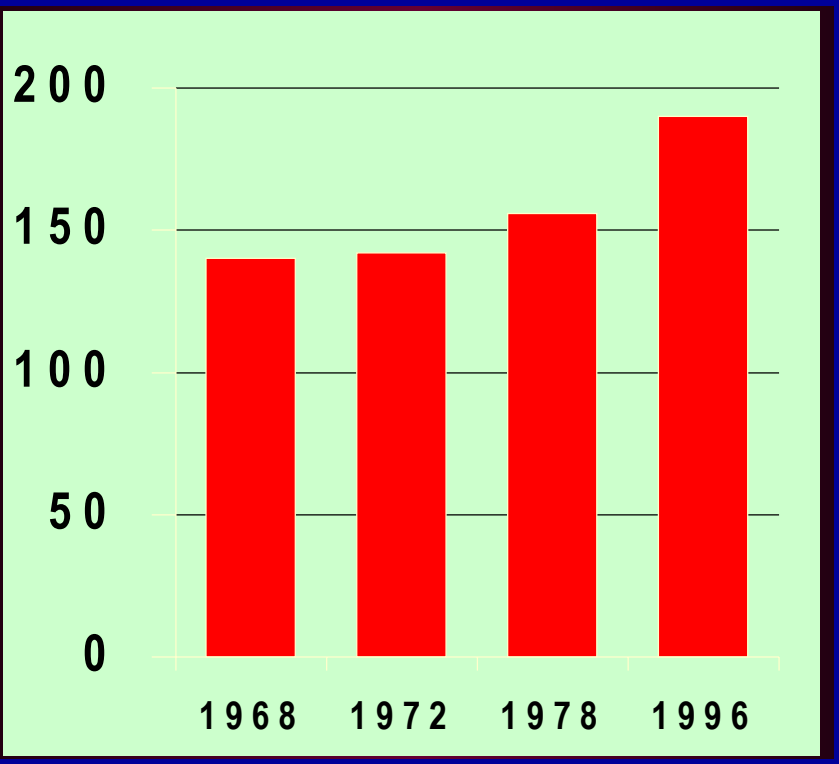
How Did This Challenge Come About?

The Primary Drivers of the Gap

- **Another round of new investments to deal with a growing population & economy.**
- **For the first time, having to substantially adjust financial approaches, to meet increasing demands for maintenance, repair, renewal and replacement associated with aging systems.**

For The Last Several Decades - The Focus

Serving More People (In Millions)

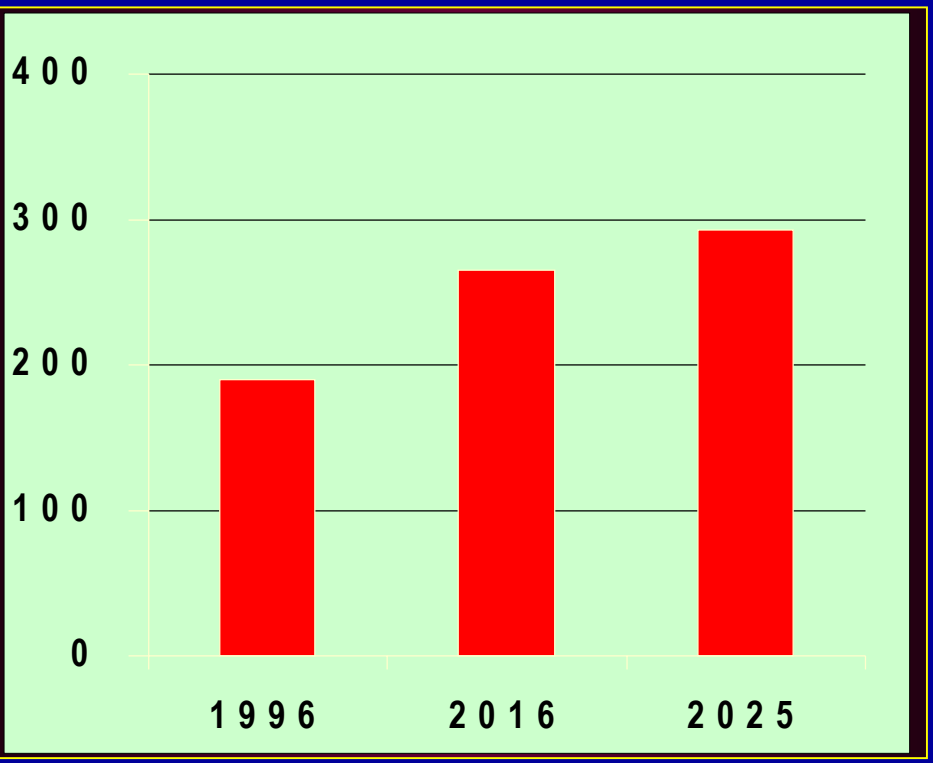


Higher levels of treatment				
	72	82	92	96
Total Plants	19,355	15,662	15,613	16,024
Less than Secondary	13.4%	19.9%	5.6%	1.1%
Secondary	48.7%	50.7%	58.2%	58.6%
More than Secondary	2.4%	17.6%	23.6%	27.6%
No Discharge	2.4%	10.2%	12.7%	12.7%

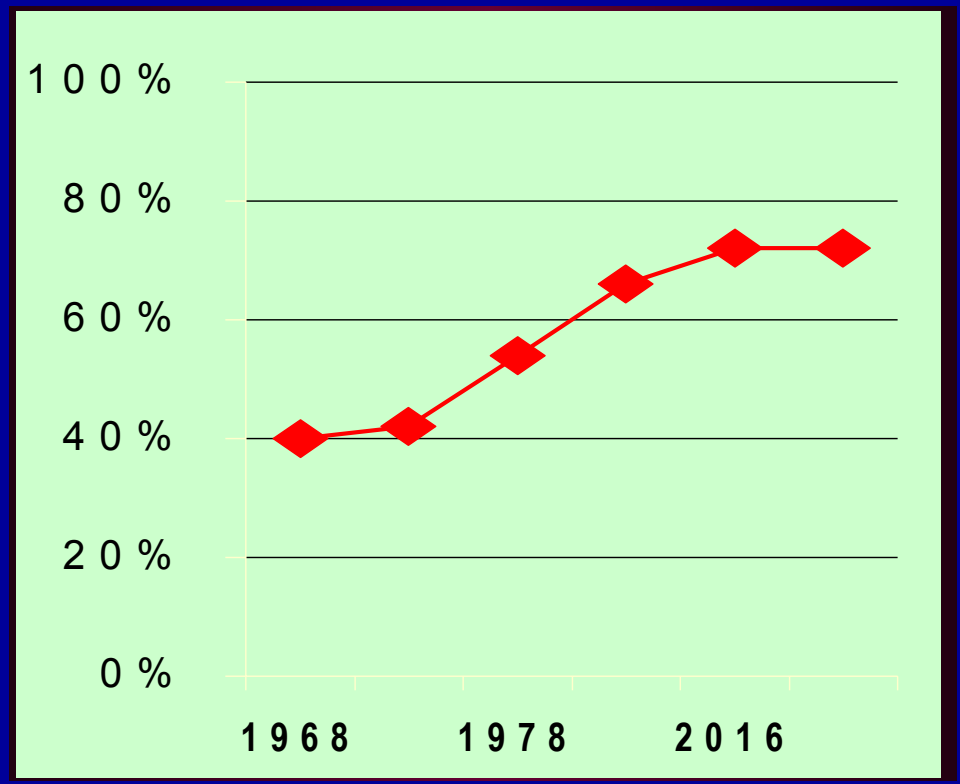
Source: USEPA, Progress in Water Quality: An Evaluation of the National Investment in Municipal Wastewater Treatment, June 2000.

The Emerging Challenge

Additional Served Population 1996 to 2025 (In Millions)

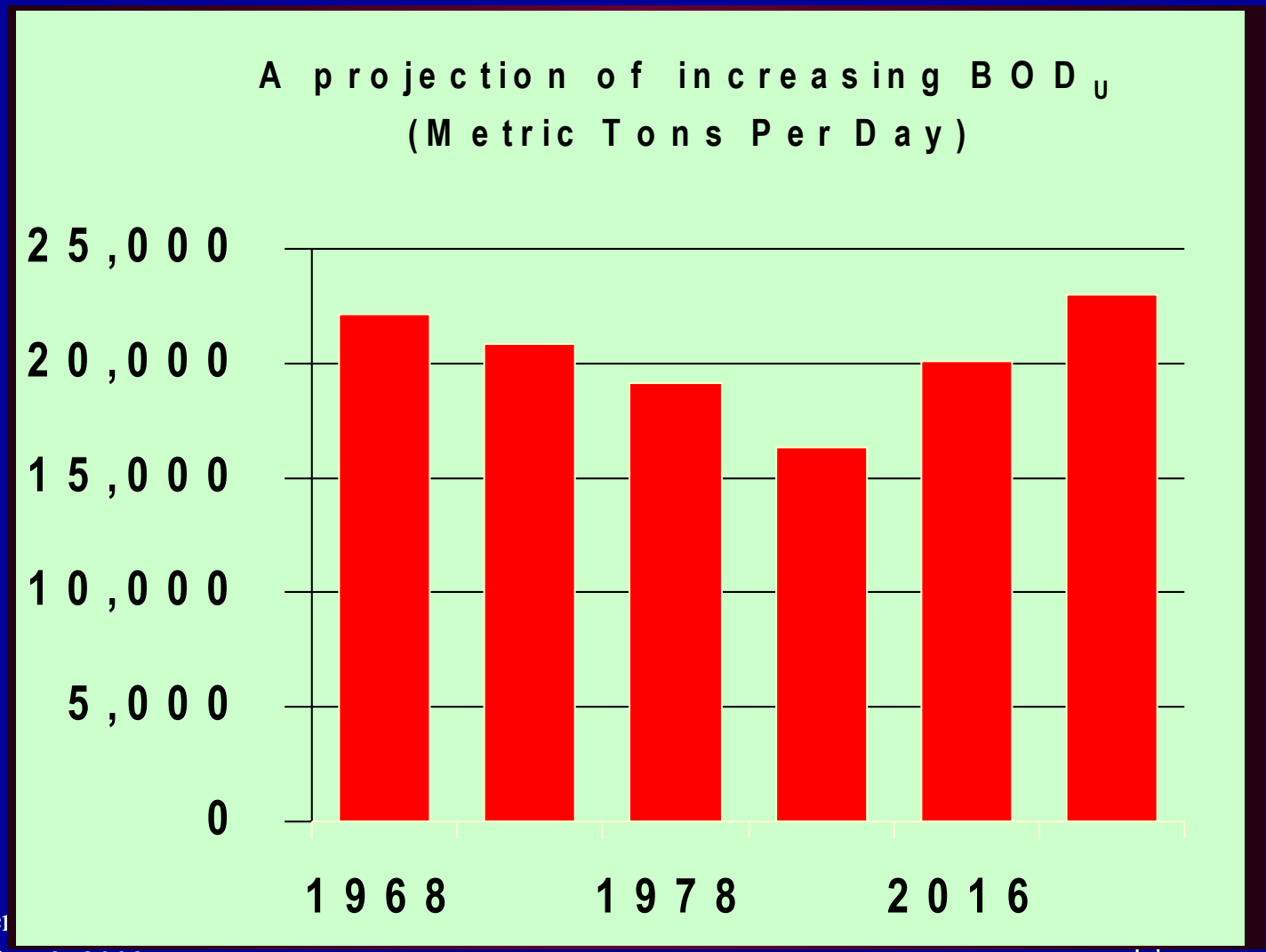


Leveling Off of BOD_U Removal Efficiencies



Source: USEPA, Progress in Water Quality: An Evaluation of the National Investment in Municipal Wastewater Treatment, June 2000.

The Additional Growth, Could Produce by 2016, BOD Loading Rates Similar to the Mid-1970s



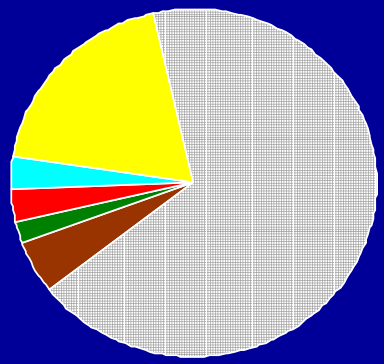
Source: USEPA, Progress in Water Quality: An Evaluation of the National Investment in Municipal Wastewater Treatment, June 2000.

More Pipe in Lower Condition Levels Will Impact Costs and Performance

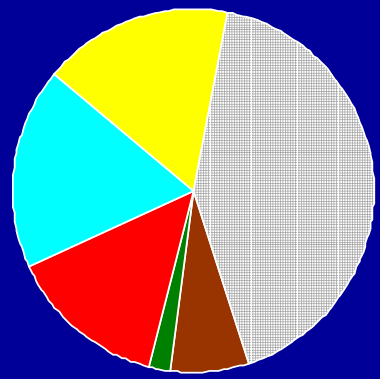
The Average Age Of Pipe Will Increase Until About 2050

- Excellent
- Good
- Fair
- Poor
- Very Poor
- Life Elapsed

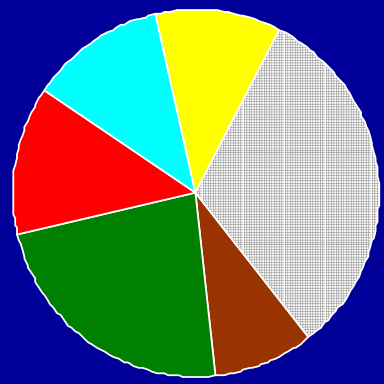
1980



2000



2020



This Is Not Currently a " It's All Broke Crisis" But, Well on the Way to a Systemic Problem

- **Our systems are aging.**
- **The status quo will result in increased public health and environment risk.**
- **Failure to manage the assets based on life cycle costs will require more revenues over the long term to meet service objectives.**

A Significant Challenge?
-- Where Do We Go From Here --

- **EPA Administrator convened an Infrastructure Forum.**
- **EPA is collaborating on various activities to promote Asset Management and Environmental Management Systems.**
- **The focus of an action agenda must be about:**
  - **Sound sustainable fiscal arrangements.**
  - **Broad application of best practices.**
  - **Investments in innovation to lower costs.**

The Future Of Water Utility Management

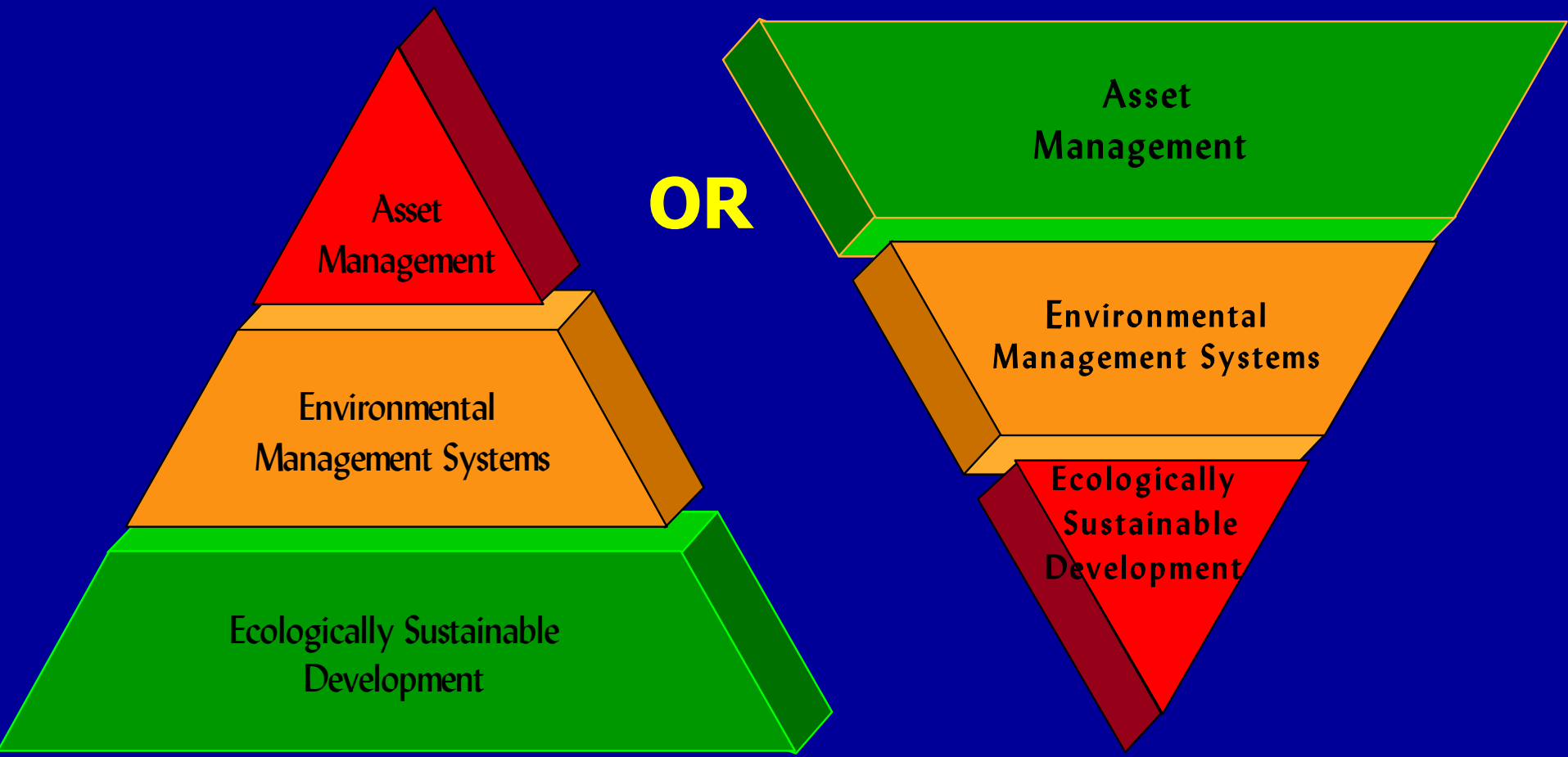
Over The Long Term Striving For Sustainable Organizations Will Lead to Significant Institutional Changes

- **Policy and organization.**
- **Governance concepts.**
- **Structure.**
- **Asset Management.**
- **Risk assessment.**
- **Setting service and performance objectives.**
- **Monitoring performance.**
- **Establishing resources and budgets.**

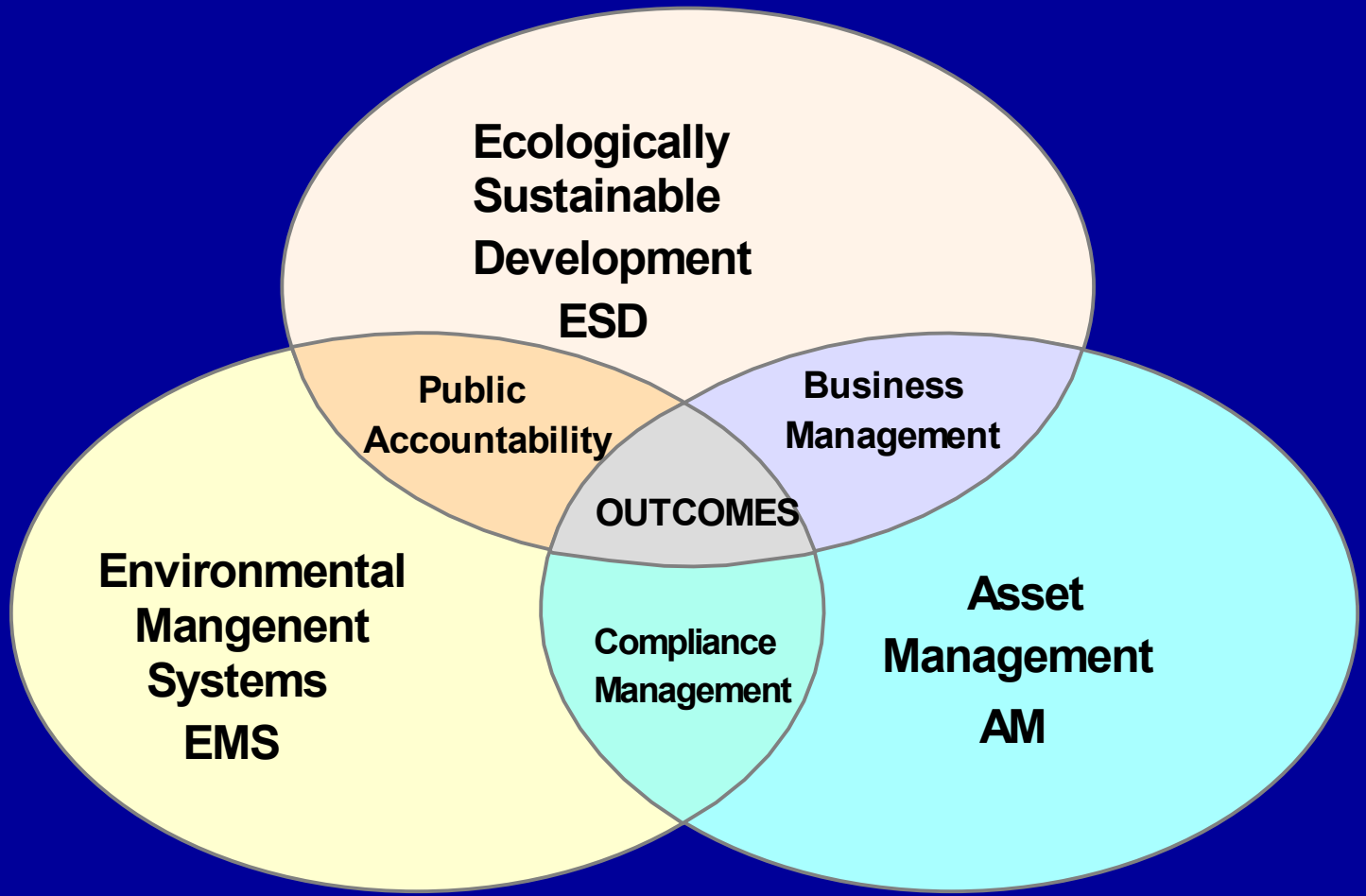
A Significant Part of The Emerging Rationale of A More Comprehensive Framework Is Embodied In The Relationship Between Three Concepts

- **Ecologically Sustainable Development**
  - Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained and the quality of life for both present and future generations is increased.
- **Environmental Management Systems**
  - A structured set of policies, procedures, and practices to reduce an organization's environmental "footprint".
- **Strategic or Total Asset Management.**
  - Managing assets to minimize the cost of owning and operating them while continuously delivering the desired or required customer service.

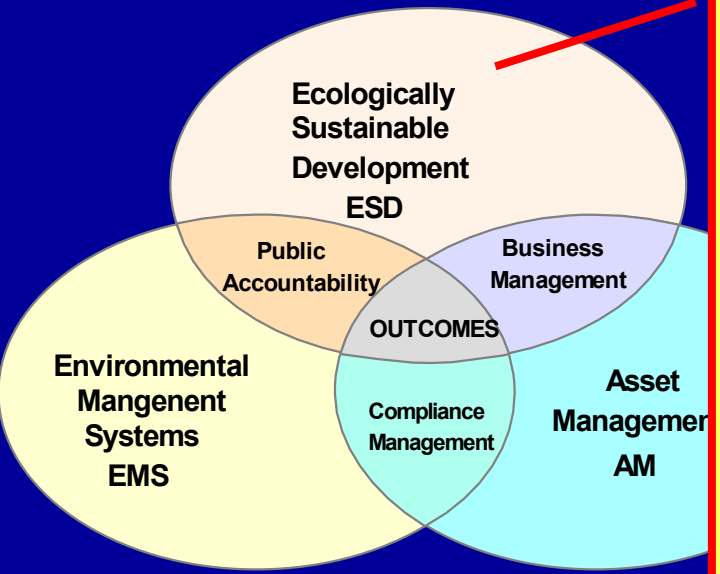
A (Suitable) View Of The Management Pyramid?



The Evolving More Holistic View



Integrating The Key Drivers



Measurable Environmental, Social and Economically Sustainable Business Practices

- The Precautionary Principle.
- Intergenerational and Intragenerational equity.
- Conservation of Biological Diversity and Ecological Integrity.
- Improved Valuation and Pricing of Environmental Resources.

Integrating The Key Drivers

Structured Set Of Policies, Procedures and Practices

- The Plan-Do-Check-Act approach.
- ISO 14001 most widely used model.
- Global Reporting Initiative Guidelines for Sustainable Reporting.
- Processes and data integrity subjected to third party audit.
- www.peercenter.net

Integrating The Key Drivers

Asset Management

- Over-arching management *paradigm*.
- Framework for management of *sustainable infrastructure* and highly focused customer service.
- AM is a core business process of corporation.
- Strategic asset planning is a way of life.
- Risk/consequence-based decision making.
- Accountability for asset condition and performance.
- Management outcomes with auditable results.

Systems and Organizational Drivers (In The Value Chain) Need To Be Integrated To Bring About Efficiency and Reflect Least Cost Strategies

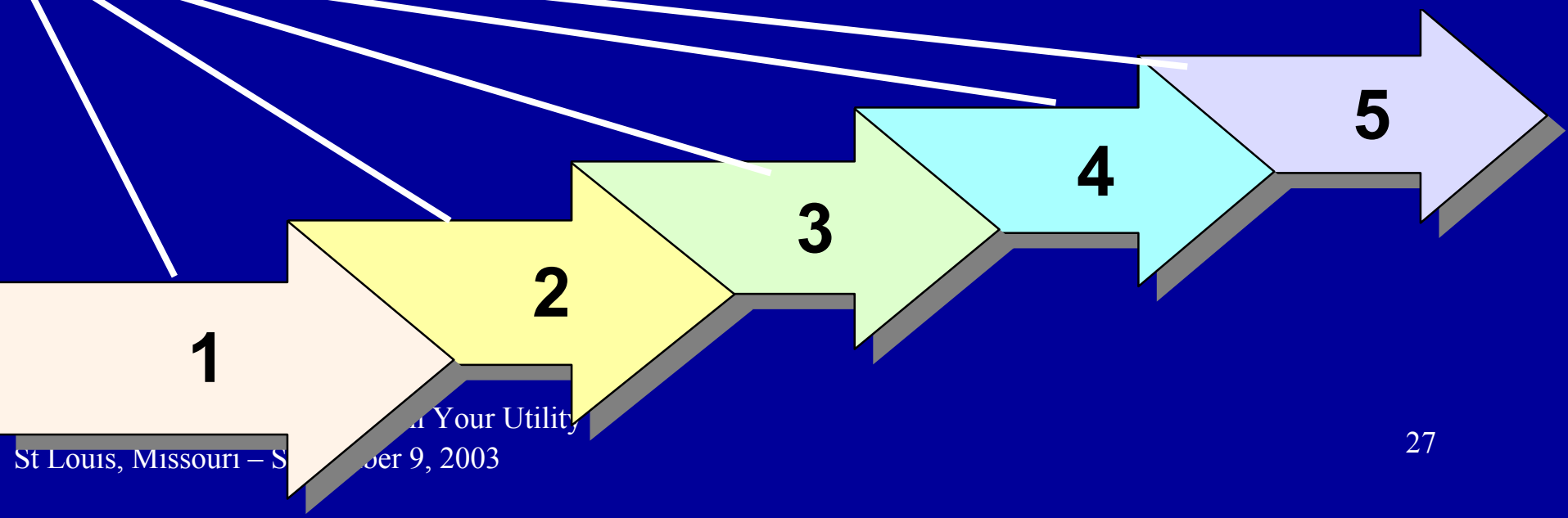
- Environment Management Plan
- Effluent Management Plan
- Biosolids Management Plan
- Pretreatment Plan

- Asset Inventory
- Condition Assessments
- Asset Management Plan
- Water Demand Management
- Infrastructure Planning
- Asset Evaluation / Renewal Maintenance

What Might Appropriate Practice Look Like For Smaller & Less Complex Organizations ?

Appropriate Practice For Many Organizations Is Taking Steps To Answer Basic Questions

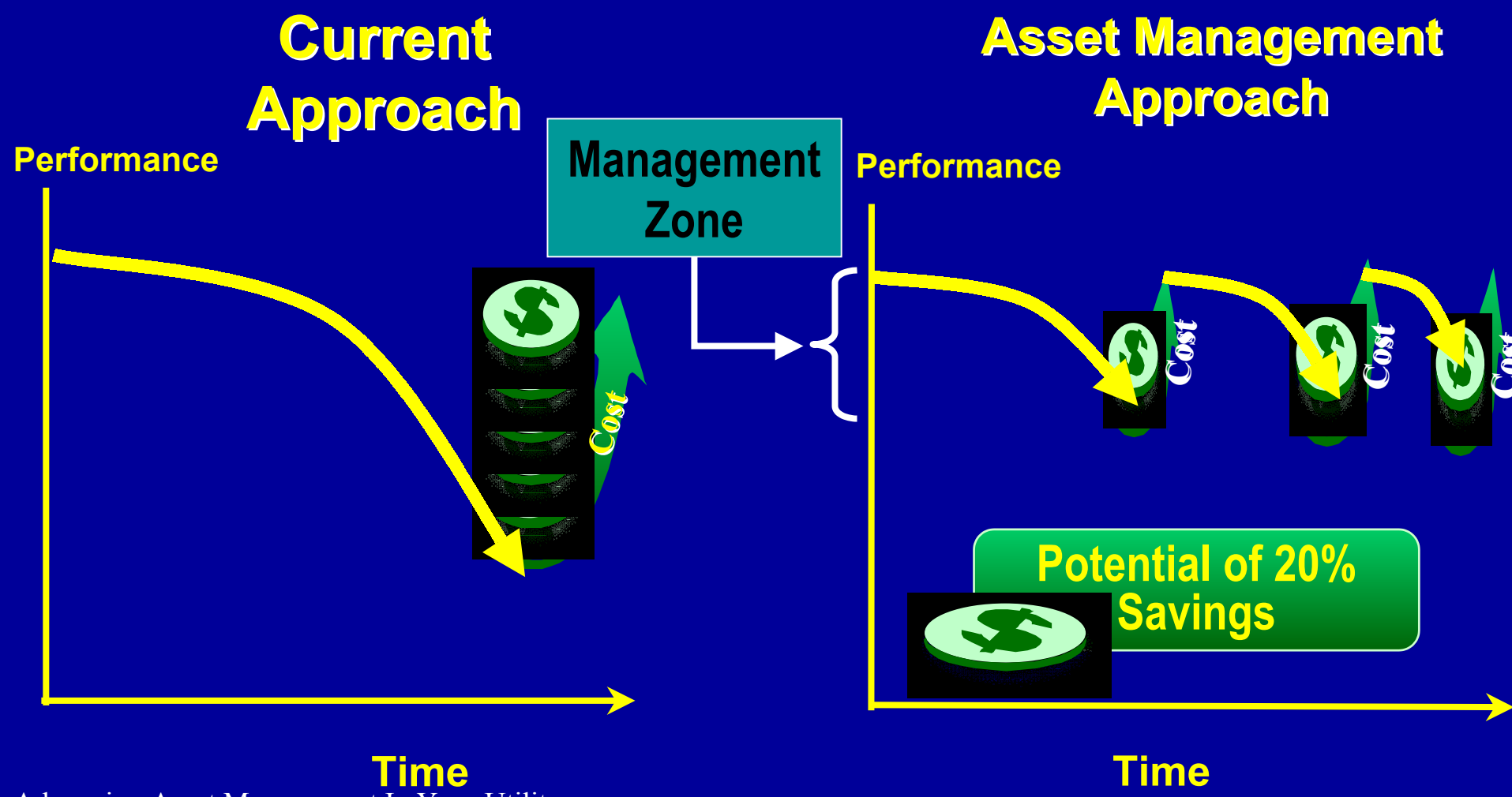
- The what, when, where of physical assets?
- What is the required Level of Service? How might it change?
- Given the system, what is critical to successful sustained performance?
- The basic information to chose a minimum life-cycle cost pathway?
- A fiscal plan for attaining sustainable economic arrangements?



The Key Characteristics of Sustainable Utilities

Welcome to the World of Asset Management

Asset Management Takes An Integrated Look At The Life Cycle of Capital and Operating Costs The Idea Is To Sustain The System In The Management Zone



Resource Information?

- **EMS Support: www.peercenter.net**
- **Asset Management Manuals and Handbooks:**
  - **Managing Public Infrastructure Assets To Minimize Cost and Maximize Performance: AMSA Publication - - www.amsa-cleanwater.org**
  - **The International Infrastructure Management Manual: www.ipwea.org.au**